



SEQUENCE LISTING

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<120> HBV VARIANTS DETECTION AND APPLICATION

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<140> 10/576,906

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<170> PatentIn version 3.2

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<400> 2

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Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
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Asn Pro His Asn Thr Lys Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110

Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
 115 120 125

Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

Pro Phe Leu Leu Val Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Thr Ala Ile
 210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr
 225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
 245 250 255

Trp Gly Thr Leu Pro Gln Glu His Ile Val Gln Lys Ile Lys
 260 265 270

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Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
 35 40 45

Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
 65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
 100 105 110

Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
 115 120 125

Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Val Arg
 145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Phe Ser Leu Leu
 165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
195 200 205

Leu Asn Pro Phe Ile Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
210 215 220

Tyr Ile
225

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<211> 268
<212> PRT
<213> hepatitis B virus

<400> 5

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 Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45
 Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60
 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80
 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95
 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110
 Ala Arg Leu Ser Ser Asn Ser Arg Ile Phe Asn His Gln His Gly Thr
 115 120 125
 Met Gln Asn Leu His Asp Ser Cys Ser Arg Lys Leu Tyr Val Ser Leu
 130 135 140
 Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160
 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175
 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190
 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205
 Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220
 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro His Lys Thr
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 Lys Arg Trp Gly His Ser Leu His Phe Met Gly Tyr Val Ile Gly Cys
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Tyr Gly Ser Leu Pro Gln Asp His Ile Arg Gln Lys
260 265

<210> 6
<211> 226
<212> PRT
<213> hepatitis B virus

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Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
20 25 30

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Thr Val Cys
35 40 45

Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
100 105 110

Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
115 120 125

Gln Gly Asn Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile
195 200 205

Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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210

215

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Tyr Ile
225

<210> 7

<211> 1045

<212> DNA

<213> hepatitis B virus

<400> 7

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<211> 271

<212> PRT

<213> hepatitis B virus

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Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45
 Phe Ser Arg Gly Asn Thr Gln Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60
 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80
 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95
 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110
 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
 115 120 125
 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140
 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160
 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175
 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190
 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205
 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220
 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
 225 230 235 240
 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
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 Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys Ile Arg Gln
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<210> 9
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<212> PRT
<213> hepatitis B virus

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<222> (208)..(208)
<223> Xaa is any amino acid

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Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
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Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Pro Lys Cys
35 40 45

Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Trp Gly
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
100 105 110

Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
115 120 125

Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

Leu Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Xaa
195 200 205

Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
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210

215

220

Tyr Ile
225

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 <212> DNA
 <213> hepatitis B virus

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<210> 11
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 <212> PRT
 <213> hepatitis B virus

<400> 11

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Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
35 40 45

Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
50 55 60

Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
85 90 95

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
100 105 110

Ala Arg Leu Ser Ser Thr Ser Arg Asn Val Asn Tyr Gln His Gly Thr
115 120 125

Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
130 135 140

Met Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
165 170 175

Pro Phe Leu Leu Thr Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Thr Ala Ile
210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr
225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
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Trp Gly Thr Leu Pro Gln Glu His Ile Val Leu
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<213> hepatitis B virus

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<221> MISC_FEATURE

<222> (172)..(172)

<223> Xaa is any amino acid

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Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Glu Ala Pro Ala Cys
35 40 45

Pro Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
100 105 110

Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala
115 120 125

Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Xaa Leu Ser Leu Leu
165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
195 200 205

Leu Ser Pro Phe Ile Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
210 215 220

Tyr Ile
225

<210> 13
<211> 953
<212> DNA
<213> hepatitis B virus

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<220>
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<222> (288)..(288)
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Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser His Ile Val
35 40 45
Asn Leu Leu Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His His
50 55 60
Ile Arg Ile Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu
65 70 75 80
Val Asp Lys Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp
85 90 95
Phe Ser Gln Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe
100 105 110
Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu
115 120 125
Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu
130 135 140
His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro
145 150 155 160
Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln
165 170 175
His Gly Thr Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr
180 185 190
Val Ser Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu
195 200 205
Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val
210 215 220
Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser
225 230 235 240
Val Val Arg Arg Ala Phe Pro His Cys Leu Val Phe Ser Tyr Val Asp
245 250 255
Asp Val Val Leu Gly Ala Lys Ser Ala Gln His Leu Glu Ser Leu Phe
260 265 270
Thr Ala Ile Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Xaa
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<220>
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<220>
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 <223> Xaa is any amino acid

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 20 25 30

Val Arg Gly Leu Tyr Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val
 35 40 45

Asn Pro Val Pro Thr Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg
 50 55 60

Thr Gly Asp Pro Ala Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu
 65 70 75 80

Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile
 85 90 95

Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe
 100 105 110

Leu Gly Gly Ala Pro Ala Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr
 115 120 125

Ser Asn His Ser Leu Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg
 130 135 140

Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu
145 150 155 160

Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro
165 170 175

Val Cys Pro Leu Leu Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys
180 185 190

Lys Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys
195 200 205

Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro
210 215 220

Ser Ser Trp Ala Phe Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg
225 230 235 240

Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly
245 250 255

Leu Ser Pro Thr Val Trp Phe Ser Val Met Trp Met Met Trp Tyr Trp
260 265 270

Gly Pro Ser Leu His Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro
275 280 285

Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa Thr Xaa Ile Lys Pro Asn
290 295 300

Val Gly Ala
305

<210> 16
<211> 988
<212> DNA
<213> hepatitis B virus

<400> 16
ccaatcggca gtcaggaaga cagcctactc ccatctctcc acctctaaga gacagtcatc 60
ctcaggccat gcagtggaac tccagcacat tccaccaagc tctgctagat cccagagtga 120
ggggcctata ctttctgct ggtggctcca gttccggaac agtaaaccct gttccgacta 180
ctgcctctcc catatcgta atcttctcga ggactgggga ccctgcaccg aatatggaga 240
gcaccacatc aggattccta ggaccctgc tctgtttaca ggcggggttt ttcttgttga 300
caagaatcct cacaatacca cagagtctag actcgtggtg gacttctctc aattttctag 360
ggggagcacc cacgtgtcct ggccaaaatt tgcagtcgcc aacctccaat cactcaccaa 420

cctcttgtcc tccaatttgt cctggttata gctggatgtg tctgcggcgt tttatcatct	480
tcctcttcat cctgctgcta tgcctcatct tcttggttgg tcttctggac taccaaggta	540
tgttgcccgt ttgtcctcta cttccaggaa catcaactac cagcacggga ccatgcaaga	600
cctgcacgac tcctgctcaa ggaacctcta tgtttccctc ttgttgctgt acaaaacctt	660
cggacggaaa ttgcacttgt attcccatcc catcatcttg ggctttcgca agattcctat	720
gggagtgggc ctcagtcctg ttctcctggc tcagtttact agtgccattt gttcagtggg	780
tcgtagggct ttccccact gtttggtctt cagttatatg gatgatgtgg tattgggggc	840
caagtctgta caacatcttg aatccctttt taccgctgtt accaattttc ttttgtcttt	900
gggtatacat ttaaacccta ctaaaactaa acgttggggc tactccctta acttcatggg	960
atatgtaatt ggaagttggg gtaccttg	988

<210> 17
 <211> 258
 <212> PRT
 <213> hepatitis B virus

<400> 17

Glu	Asp	Trp	Gly	Pro	Cys	Thr	Glu	Tyr	Gly	Glu	His	His	Ile	Arg	Ile
1				5					10					15	

Pro	Arg	Thr	Pro	Ala	Arg	Val	Thr	Gly	Gly	Val	Phe	Leu	Val	Asp	Lys
			20					25					30		

Asn	Pro	His	Asn	Thr	Thr	Glu	Ser	Arg	Leu	Val	Val	Asp	Phe	Ser	Gln
		35					40					45			

Phe	Ser	Arg	Gly	Ser	Thr	His	Val	Ser	Trp	Pro	Lys	Phe	Ala	Val	Pro
	50					55					60				

Asn	Leu	Gln	Ser	Leu	Thr	Asn	Leu	Leu	Ser	Ser	Asn	Leu	Ser	Trp	Leu
65					70					75					80

Ser	Leu	Asp	Val	Ser	Ala	Ala	Phe	Tyr	His	Leu	Pro	Leu	His	Pro	Ala
				85					90					95	

Ala	Met	Pro	His	Leu	Leu	Val	Gly	Ser	Ser	Gly	Leu	Pro	Arg	Tyr	Val
			100					105					110		

Ala	Arg	Leu	Ser	Ser	Thr	Ser	Arg	Asn	Ile	Asn	Tyr	Gln	His	Gly	Thr
		115					120					125			

Met	Gln	Asp	Leu	His	Asp	Ser	Cys	Ser	Arg	Asn	Leu	Tyr	Val	Ser	Leu
	130					135					140				

Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
165 170 175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
245 250 255

Trp Gly

<210> 18
<211> 226
<212> PRT
<213> hepatitis B virus

<400> 18

Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln
1 5 10 15

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
20 25 30

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
35 40 45

Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
18

100 105 110
 Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala
 115 120 125
 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140
 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
 145 150 155 160
 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175
 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190
 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
 195 200 205
 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
 210 215 220
 Tyr Ile
 225

<210> 19
 <211> 1043
 <212> DNA
 <213> hepatitis B virus

<400> 19
 tccgcctcct gcctccacca atcgccagtc aggaaggcaa cctaccccgc tctctccacc 60
 tttgagagac actcatcctc aggccgtgca gtggaactcc acaaccttcc accaaactct 120
 gcaagatccc agagtgaggg gcctgtatct ccctgctggt ggctccagtt caggaacagc 180
 aaaccctggt ccgactactg cctctcgctt atcgtcaatc ttctcgagga ttggggaccc 240
 tgcgctgaac atggagaaca tcacatcagg actcctagga ccccttctcg tgttacaggc 300
 ggggtttttc ttgttgacaa gaatcctcac aataccgcag agtctagact cgtggtggac 360
 ttctctcagt tttctagggg gaactaccgt gtgtcttggc caaaattcgc ggtccccaac 420
 ctccaatcac tcaccaacct cctgtcctcc gacttgtcct ggttatcgct ggatgtatct 480
 gcggcgTTTT atcatattcc tcttcacct gctgctatgc ctcatcttct tgttggttct 540
 tctggactat caaggatatgt tgcccgtttg tcctctaatt ccaggatcct caaccaccag 600
 cacgggaaca tgccgaacct gcacgactcc tgctcaagga acctctatgt atccctcctg 660
 ttgctgtacc aaaccttcgg acggaaattg cacctgtatt cccatcccat catcttgggc 720
 19

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Thr Pro Asn Lys Thr
225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
245 250 255

Tyr Gly

<210> 21
<211> 226
<212> PRT
<213> hepatitis B virus

<400> 21

Met Glu Asn Ile Thr Ser Gly Leu Leu Gly Pro Leu Leu Val Leu Gln
1 5 10 15

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
20 25 30

Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys
35 40 45

Leu Gly Gln Asn Ser Arg Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
100 105 110

Ser Ser Thr Thr Ser Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala
115 120 125

Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys
 145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
 165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
 180 185 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Ser Ile
 195 200 205

Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
 210 215 220

Tyr Ile
 225

<210> 22
 <211> 1027
 <212> DNA
 <213> hepatitis B virus

<400> 22
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 tgagagacac tcatcctcag gccgtgcagt ggaactccac aaccttccac caaactctgc 120
 aagatcccag agtgagaggc ctgtatttcc ctgctggtgg ctccagttca ggaacagtaa 180
 accctgttcc gaccactgcc tctcccttat cgtcaatctt ctcgaggatt ggggaccctg 240
 cgctgaacat ggagaacatc acatcaggat tcctaggacc ctttctcgtg ttacaggcgg 300
 ggtttttctt gttgacaaga atcctcacia taccgcagag tctagactcg tgggtggactt 360
 ctctcagttt tctaggggaa accaccgtgt gtcttgcca aaattcgcag tccccaacct 420
 ccaatcactc accaacctcc tgtcctccaa cttgtcctgg ttatcgctgg atgtgtctgc 480
 ggcgttttat catattcctc ttcatcctgc tgctatgcct catcttcttg ttggttcttc 540
 tggactatca aggtatgttg cccgtttgtc ctctaattcc aggatcctca accaccagca 600
 cgggaccatg ccgaacctgc acgactcctg ctcaaggaa ctttatgtat ccctcctggt 660
 gctgtaccaa accttcggac ggaaattgca cctgtattcc catcccatca tcttgggctt 720
 tcgcaaaatt cctatgggag tggggctcag cccgtttctc atgggtcagt ttactagtgc 780
 catttgttca gtggttcgta gggctttccc cactgtttg gctttcagtt atgtggatga 840
 tgtggtattg ggggccaagt ctgtatcgca tcttgagtcc ctttttaccg ctgttaccaa 900

ttttcttttg tctttgggta tacatttaaa ccctaacaaa acgaaaagat ggggttactc 960
 tttaaatttt atgggggatg ttattggatg ttatgggtcc ttgccacaag aacacatcgt 1020
 acaaaaaa 1027

<210> 23
 <211> 264
 <212> PRT
 <213> hepatitis B virus

<400> 23

Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg Ile
 1 5 10 15

Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 20 25 30

Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

Phe Ser Arg Gly Asn His Arg Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile Pro Leu His Pro Ala
 85 90 95

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
 100 105 110

Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly Thr
 115 120 125

Met Pro Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Val Asp Asp Val Val
 195 200 205

Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser Leu Phe Thr Ala Val
 210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr
 225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Cys
 245 250 255

Tyr Gly Ser Leu Pro Gln Glu His
 260

<210> 24
 <211> 226
 <212> PRT
 <213> hepatitis B virus

<400> 24

Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln
 1 5 10 15

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
 20 25 30

Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Glu Thr Thr Val Cys
 35 40 45

Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
 50 55 60

Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
 65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
 85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
 100 105 110

Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
 115 120 125

Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
 130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys
 145 150 155 160

Phe Leu Trp Glu Trp Gly Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

Ser Val Met Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile
195 200 205

Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
210 215 220

Tyr Ile
225

<210> 25
<211> 560
<212> DNA
<213> hepatitis B virus

<400> 25
caacttgctcc tggttatcgc tggatgtgtc tgcggcggtt tatcatattc ctcttcatcc 60
tgctgctatg cctcatcttc ttgttggttc ttctggacta tcgaggtatg ttgcccgttt 120
gtcctctact tccaggatct tcaaccacca gcacgggtcc atgcagaacc tgcacgactc 180
ctgctcaagg aacctctatg tatccctcat gttgctgtac caaaccttcg gacggaaatt 240
gcacctgtat tcccatccca tcatcctggg ctttcggaaa attcctatgg gagtgggcct 300
cagcccgttt ctcatggctc agtttactag tgccatttgt tcagtgggtc gtagggcttt 360
ccccattgt ttggctttca gttatgtgga tgatgtggta ttgggggcca agtctgtatc 420
gcatcttgag tcccttttta ccgctgttac caattttctt ttgtctctgg gtatacattt 480
aaaccctcac aaaacaaaaa gatgggggta ctctttacat ttcatgggct atgtcatcgg 540
atgttatggg tctttgccac 560

<210> 26
<211> 186
<212> PRT
<213> hepatitis B virus

<400> 26

Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile
1 5 10 15

Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly
20 25 30

Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Ile Phe Asn
25

35 40 45
 His Gln His Gly Ser Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn
 50 55 60
 Leu Tyr Val Ser Leu Met Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu
 65 70 75 80
 His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met
 85 90 95
 Gly Val Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile
 100 105 110
 Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr
 115 120 125
 Val Asp Asp Val Val Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser
 130 135 140
 Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu
 145 150 155 160
 Asn Pro His Lys Thr Lys Arg Trp Gly Tyr Ser Leu His Phe Met Gly
 165 170 175
 Tyr Val Ile Gly Cys Tyr Gly Ser Leu Pro
 180 185

<210> 27
 <211> 160
 <212> PRT
 <213> hepatitis B virus

<220>
 <221> MISC_FEATURE
 <222> (160)..(160)
 <223> Xaa is any amino acid

<400> 27

Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe
 1 5 10 15
 Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp
 20 25 30
 Tyr Arg Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Ser Ser Thr
 35 40 45

Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr
 50 55 60
 Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys
 65 70 75 80
 Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp
 85 90 95
 Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe
 100 105 110
 Val Gln Trp Phe Val Gly Leu Ser Pro Ile Val Trp Leu Ser Val Met
 115 120 125
 Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile Leu Ser Pro
 130 135 140
 Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa
 145 150 155 160

<210> 28
 <211> 1029
 <212> DNA
 <213> hepatitis B virus

<400> 28
 cgccctcctcc tgcctccacc atcggcagtc aggaagaaag cctactccca tctctccacc 60
 tctaagagac agtcacctc aggccatgca gtggaactcc agcacattcc accaagctct 120
 gctagatccc aragtgagrg gcctatactt tctgtctggt ggctccagtt ccggaacagt 180
 aaaccctggt cggactactg cctctcccat atcgtcaatc ttctcgagga ctggggaccc 240
 tgcaccgaat atggagagca caacatcagg attcctagga cccctgctcg tggtacaggc 300
 ggggtttttc ttgttgacaa gaatcctcac aataccacag agtctagact cgtggtggac 360
 ttctctcaat ttcttagggg gagcaccac gtgtcctggc caaaatttgc agtccccaac 420
 ctccaatcac tcaccaacct cttgtcctcc aatttgtcct ggttatcgct ggatgtgtct 480
 gcggcgtttt atcatcttcc tcttcacct gctgctatgc ctcatcttct tgtkgttct 540
 tctggactac caaggtatgt tgcccgtttg tcctctactt ccaggaacat caactaccag 600
 cacgggacca tgcaagacct gcacgattcc tgctcaagga acctctatgt ttccctcttg 660
 ttgctgtaca aaaccttcgg acggaaattg cacttgatt cccatcccat catcttgggc 720
 tttcgcaaga ttctatggg agtgggcctc agtccgtttc tcctggctca gtttactagt 780
 gccatttgtt cagtggttcg tagggctttc cccactggt tggctttcag ttatatggat 840
 gatgtggtat tgggggccaa gtctgtacaa catcttgaat ccttttttac cgctgttacc 900

aattttcttt tgtctttggg tatacattta aaccctacta aaactaaacg ttggggctac 960
 tcccttaact tcatgggata tgtaattgga agttggggta ccttaccaca ggaacatatt 1020
 gtacacaaa 1029

<210> 29
 <211> 268
 <212> PRT
 <213> hepatitis B virus

<400> 29

Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His Asn Ile Arg Ile
 1 5 10 15

Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
 20 25 30

Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
 35 40 45

Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro
 50 55 60

Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
 65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
 85 90 95

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val
 100 105 110

Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr
 115 120 125

Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
 130 135 140

Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His
 145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
 165 170 175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg
 180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
 195 200 205

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val
210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr
225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser
245 250 255

Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys
260 265

<210> 30
<211> 226
<212> PRT
<213> hepatitis B virus

<220>
<221> MISC_FEATURE
<222> (95)..(95)
<223> xaa is any amino acid

<400> 30

Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln
1 5 10 15

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu
20 25 30

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys
35 40 45

Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser
50 55 60

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Xaa Val
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly
100 105 110

Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala
115 120 125

Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp
29

130

135

140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg
145 150 155 160

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
195 200 205

Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
210 215 220

Tyr Ile
225

<210> 31
<211> 1035
<212> DNA
<213> hepatitis B virus

<400> 31
ctcctcctgc ctccaccaat cggcagtcag gaagacagcc tacacccatc tctccacctc 60
taagagacag tcctcctcag gccatgcagt ggaactccag cacattccac caagctctgc 120
tagatcccag agtgaggggc ctatactttc ctgctggttg ctccagttca ggaacagtaa 180
accctgtttc gactactgcc tctcccatat cgtcaatctt ctcgaggact ggggaccctg 240
caccgaatat ggagagcacc acatcaggat tcctaggacc cctgctcgtg ttacaggcgg 300
ggtttttctt gttgacaaga atcctcacia taccacagag tctagactcg tgggtggactt 360
ctctcaattt tctaggggga gcacccacgt gtcctggcca aaatttgag tccccaacct 420
ccaatcactc accaacctct tgtcctccaa ttgtcctggt ttatcgctgg atgtgtctgc 480
ggcgttttat catcttcctc ttcctcctgc tgctatgcct catcttcttg ttggttcttc 540
tggtactacca aggtatgttg cccgtttgtc ctctacttcc aggaacatca actaccagca 600
cgggaccatg caagacctgc acgattcctg ctcaaggaac ctctatgttt ccctcttggt 660
gctgtacaaa accttcggac ggaaattgca cttgtattcc catcccatca tcttgggctt 720
tcgcaagatt cctatgggag tgggcctcag tccgtttctc ctggctcagt ttactagtgc 780
catttgttca gtggttcgta gggctttccc cactgtttg gctttcagtt atatggatga 840
tgtggtattg ggggccaagt ctgtacaaca tcttgaatcc ctttttaccg ctgttaccaa 900
ttttcttttg tctttgggta tacatttaaa ccctrctaaa accaaacgtt ggggttactc 960

ccttaacttc atgggatatg taattggaag ttgggggtacc ttaccacagg aacatattgt 1020
acacaaaatc aaaca 1035

<210> 32
<211> 344
<212> PRT
<213> hepatitis B virus

<220>
<221> MISC_FEATURE
<222> (312)..(312)
<223> Xaa is any amino acid

<400> 32

Ser Ser Cys Leu His Gln Ser Ala Val Arg Lys Thr Ala Tyr Thr His
1 5 10 15

Leu Ser Thr Ser Lys Arg Gln Ser Ser Ser Gly His Ala Val Glu Leu
20 25 30

Gln His Ile Pro Pro Ser Ser Ala Arg Ser Gln Ser Glu Gly Pro Ile
35 40 45

Leu Ser Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp
50 55 60

Tyr Cys Leu Ser His Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys
65 70 75 80

Thr Glu Tyr Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ala Arg
85 90 95

Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Thr
100 105 110

Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Ser Thr
115 120 125

His Val Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr
130 135 140

Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala
145 150 155 160

Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro His Leu Leu
165 170 175

Val Gly Ser Ser Gly Leu Pro Arg Tyr Val Ala Arg Leu Ser Ser Thr
31

Ser Pro Pro Leu Arg Asp Ser His Pro Gln Ala Met Gln Trp Asn Ser
 20 25 30
 Ser Thr Phe His Gln Ala Leu Leu Asp Pro Arg Val Arg Gly Leu Tyr
 35 40 45
 Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val Asn Pro Val Pro Thr
 50 55 60
 Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg Thr Gly Asp Pro Ala
 65 70 75 80
 Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val
 85 90 95
 Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln
 100 105 110
 Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro
 115 120 125
 Thr Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro
 130 135 140
 Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg
 145 150 155 160
 Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Cys Leu Ile Phe Leu
 165 170 175
 Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu
 180 185 190
 Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile
 195 200 205
 Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro
 210 215 220
 Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe
 225 230 235 240
 Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser
 245 250 255
 Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val
 260 265 270

Trp Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr
 275 280 285

Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu
 290 295 300

Trp Val Tyr Ile Xaa Thr Leu Leu Lys Pro Asn Val Gly Val Thr Pro
 305 310 315 320

Leu Thr Ser Trp Asp Met Xaa Leu Glu Val Gly Val Pro Tyr His Arg
 325 330 335

Asn Ile Leu Tyr Thr Lys Ser Asn
 340

<210> 34
 <211> 980
 <212> DNA
 <213> hepatitis B virus

<400> 34
 cagtcggaaggcagcctac tcccttatct ccacctctaa gggacactca tcctcaggcc 60
 atgcagtggga actccaccac ttcccatcaa actcttcaag atcccagagt cagggtctctg 120
 tactttcctg ctggtggctc cagttcagga acagtgaagc ctgctcagaa tactgcctct 180
 gccatatcgt caacctttctc gaagactggg gaccctgtac cgaacatgga gaacatcgca 240
 tcaggactcc taggaccctc gtcgcggtta caggcggggt tttctcgtt gacaaaaatc 300
 ctcacaatac cacagagtct agactcgtgg tggactttctc tcaattttct agggggaaca 360
 cccgtgtgtc ttggccaaaa ttgcagtc caaatctcca gtcactcacc aacttggtgt 420
 cctccaattt gtcctgggtta tcgctggatg tgtctgcggc gttttatcat cttcctctgc 480
 atcctgctgc tatgcctcat cttcttggtg gttcttctgg actatcaagg tatgttgccc 540
 gtttgtcctc taattccagg atcatcaacc accagcaccg gaccatgcag aacctgcacg 600
 actcctgctc aaggaacctc tatgtttccc tcatgttgct gtacaaaacc tacggacgga 660
 aactgcacct gtattcccat cccatcatct tgggctttcg caaaatacct atgggagtg 720
 gcctcagtc gtttctcttg gtcagttta ctagtgccgt ttgttcagtg gttcgtaggg 780
 ctttcccca ctgtctggct ttcagttata tggatgatgt ggtattgggg gccaaagtctg 840
 tacaacatct tgagtcctt tatgccgctg ttaccaattt tcttttgtct ttgggtatac 900
 atttaaacc tcacaaaaca aaaagatggg gatattccct tcaattcatg ggatatgtaa 960
 ttggggggtg gggctccttg 980

<210> 35
 <211> 258

<212> PRT
<213> hepatitis B virus

<400> 35

Glu Asp Trp Gly Pro Cys Thr Glu His Gly Glu His Arg Ile Arg Thr
1 5 10 15

Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys
20 25 30

Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln
35 40 45

Phe Ser Arg Gly Asn Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro
50 55 60

Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu
65 70 75 80

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala
85 90 95

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val
100 105 110

Ala Arg Leu Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Arg Thr
115 120 125

Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu
130 135 140

Met Leu Leu Tyr Lys Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser His
145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser
165 170 175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Val Cys Ser Val Val Arg
180 185 190

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val
195 200 205

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Ala Ala Val
210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro His Lys Thr
225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Gln Phe Met Gly Tyr Val Ile Gly Gly
245 250 255

Trp Gly

<210> 36
<211> 226
<212> PRT
<213> hepatitis B virus

<400> 36

Met Glu Asn Ile Ala Ser Gly Leu Leu Gly Pro Leu Leu Ala Leu Gln
1 5 10 15

Ala Gly Phe Phe Ser Leu Thr Lys Ile Leu Thr Ile Pro Gln Ser Leu
20 25 30

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Pro Val Cys
35 40 45

Leu Gly Gln Asn Ser Gln Ser Gln Ile Ser Ser His Ser Pro Thr Cys
50 55 60

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe
65 70 75 80

Ile Ile Phe Leu Cys Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val
85 90 95

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly
100 105 110

Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala
115 120 125

Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Thr Asp
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys
145 150 155 160

Tyr Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu
165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu
180 185 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile
 195 200 205

Leu Ser Pro Phe Met Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val
 210 215 220

Tyr Ile
 225

<210> 37
 <211> 900
 <212> DNA
 <213> hepatitis B virus

<400> 37
 cctgctggtg gctccagttc aggaacagta aaccctgttc cgactactgc ctctccctta 60
 tcgtcaatct tctcgaggat tggggaccct gcgctgaaca tggagaacat cacatcagga 120
 ttcttaggac cccttctcgt gttacaggcg ggggttttct tgttgacaag aatcctcaca 180
 ataccgcaga gtctagactc gtggtggact tctctcaatt ttcgaggggg aactaccgtg 240
 tgtcttggcc aaaattcgca gtccccaacc tccaatcact caccaacctc ctgtcctcca 300
 acttgctctg gttatcgctg gatgtgtctg cggcgtttta tcatmttcct cttcatcctg 360
 ctgctatgcc tcatcttctt gttggttctt ctggactatc raggtatgtt gcccgtttgt 420
 cctctaattc caggatcctc awccaccagc acgggaccat gccgaacctg catgactact 480
 gctcaaggaa cctctatgta tccctcctgt tgctgtacca aacctacgga cggaaattgc 540
 acctgtattc ccatcccatc atcctgggct ttcggaaaat tcctatggga gtgggcctca 600
 gcccgtttct cctggctcag ttactagtgc ccatttggtc agtggttcgt agggctttcc 660
 cccactgttt ggctttcagt tatatggatg atgtggtatt gggggccaag tctgtaymgc 720
 atcttgagtc cctttttacc gctgttacca attttctttt gtctttgggt atacatttaa 780
 accctaaca aacaaagaga tggggttact ctctgaattt tatgggttat gtcattggaa 840
 gttatgggtc cttgccacaa gaacacatca tacaaaaaat caaagaatgt tttagaaaac 900

<210> 38
 <211> 299
 <212> PRT
 <213> hepatitis B virus

<220>
 <221> MISC_FEATURE
 <222> (115)..(115)
 <223> n=any nucleotide

<220>
 <221> MISC_FEATURE
 <222> (147)..(147)
 <223> n=any nucleotide

<220>
 <221> MISC_FEATURE
 <222> (239)..(239)
 <223> n=any nucleotide

<400> 38

Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys
 1 5 10 15

Leu Ser Leu Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys Ala Glu
 20 25 30

His Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ser Arg Val Thr
 35 40 45

Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Ala Glu Ser
 50 55 60

Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Asn Tyr Arg Val
 65 70 75 80

Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu
 85 90 95

Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe
 100 105 110

Tyr His Xaa Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly
 115 120 125

Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Asn Ser Arg
 130 135 140

Ile Leu Xaa His Gln His Gly Thr Met Pro Asn Leu His Asp Tyr Cys
 145 150 155 160

Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Tyr Gln Thr Tyr Gly
 165 170 175

Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys
 180 185 190

Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln Phe Thr
 195 200 205

Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala
 210 215 220

Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val Xaa His
225 230 235 240

Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly
245 250 255

Ile His Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn
260 265 270

Phe Met Gly Tyr Val Ile Gly Ser Tyr Gly Ser Leu Pro Gln Glu His
275 280 285

Ile Ile Gln Lys Ile Lys Glu Cys Phe Arg Lys
290 295

<210> 39
<211> 259
<212> PRT
<213> hepatitis B virus

<220>
<221> MISC_FEATURE
<222> (134)..(134)
<223> Xaa is any amino acid

<220>
<221> MISC_FEATURE
<222> (148)..(148)
<223> Xaa is any amino acid

<220>
<221> MISC_FEATURE
<222> (240)..(240)
<223> Xaa is any amino acid

<400> 39

Pro Ala Gly Gly Ser Ser Ser Gly Thr Val Asn Pro Val Pro Thr Thr
1 5 10 15

Ala Ser Pro Leu Ser Ser Ile Phe Ser Arg Ile Gly Asp Pro Ala Leu
20 25 30

Asn Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu
35 40 45

Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser
50 55 60

Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Arg Gly Gly Thr Thr Val
65 70 75 80

Cys Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr
39


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ttttatcatc ttctcttca tcctgctgct atgcctcatc ttcttggttg ttcttctgga 420
ctatcraggt atgttgcccg ttgtcctct aattccagga tcctcaacca ccagcacggg 480
accatgccga acctgcatga ctactgctca aggaacctct atgtatccct cctgttgctg 540
taccaaacct acggacggaa attgcacctg tattcccatc ccatcatcct gggctttcgg 600
aaaattccta tgggagtggg cctcagcccg ttctcctggt ctgagtttac tagtgccatt 660
tgttcagtgg ttctgtagggc tttcccccac tgtttggtt tcagttatat ggatgatgtg 720
gtattggggg ccaagtctgy acagcatctt gagtcccttt ttaccgcggt gaccaatatt 780
cttttgtctt tgggtataca tttaaacctt aacaaaacaa agagatgggg ttactctctg 840
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aaaatcaaag aa 912

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<210> 41
<211> 304
<212> PRT
<213> hepatitis B virus

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<220>
<221> MISC_FEATURE
<222> (247)..(247)
<223> Xaa is any amino acid

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<400> 41
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Leu Ser Pro Asn Ser Ala Arg Ser Pro Cys Trp Trp Leu Gln Phe Arg
1          5          10          15

```

```

Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser Leu Ile Val Asn Leu
20          25          30

```

```

Leu Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg
35          40          45

```

```

Ile Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp
50          55          60

```

```

Lys Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser
65          70          75          80

```

```

Gln Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val
85          90          95

```

```

Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp
100         105         110

```

```

Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro
41

```

115	120	125
Ala Ala Met Pro His Leu 130	Leu Val Gly Ser Ser 135	Gly Leu Ser Arg Tyr 140
Val Ala Arg Leu Ser 145	Ser Asn Ser Arg Ile 150	Leu Asn His Gln His Gly 155 160
Thr Met Pro Asn 165	Leu His Asp Tyr Cys 170	Ser Arg Asn Leu Tyr Val Ser 175
Leu Leu Leu 180	Leu Tyr Gln Thr Tyr 185	Gly Arg Lys Leu His Leu Tyr Ser 190
His Pro Ile 195	Ile Leu Gly Phe Arg 200	Lys Ile Pro Met Gly Val Gly Leu 205
Ser Pro Phe Leu Leu Ala 210	Gln Phe Thr Ser Ala 215	Ile Cys Ser Val Val 220
Arg Arg Ala Phe Pro 225	His Cys Leu Ala Phe 230	Ser Tyr Met Asp Asp Val 235 240
Val Leu Gly Ala 245	Lys Ser Xaa Gln His 250	Leu Glu Ser Leu Phe Thr Ala 255
Val Thr Asn 260	Phe Leu Leu Ser Leu 265	Gly Ile His Leu Asn Pro Asn Lys 270
Thr Lys Arg Trp Gly Tyr 275	Ser Leu Asn Phe Met 280	Gly Tyr Val Ile Gly 285
Ser Tyr Gly Ser Leu Pro 290	Gln Glu His Ile Ile 295	Gln Lys Ile Lys Glu 300

<210> 42
 <211> 266
 <212> PRT
 <213> hepatitis B virus

<220>
 <221> MISC_FEATURE
 <222> (142)..(142)
 <223> Xaa is any amino acid

<220>
 <221> MISC_FEATURE
 <222> (247)..(247)
 <223> Xaa is any amino acid

<400> 42

Phe His Gln Thr Leu Gln Asp Pro Pro Ala Gly Gly Ser Ser Ser Gly
 1 5 10 15
 Thr Val Asn Pro Val Pro Thr Thr Ala Ser Pro Leu Ser Ser Ile Phe
 20 25 30
 Ser Arg Ile Gly Asp Pro Ala Arg Asn Met Glu Asn Ile Thr Ser Gly
 35 40 45
 Phe Leu Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr
 50 55 60
 Arg Ile Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu
 65 70 75 80
 Asn Phe Leu Gly Gly Thr Thr Val Cys Leu Gly Gln Asn Ser Gln Ser
 85 90 95
 Pro Thr Ser Asn His Ser Pro Thr Ser Cys Pro Pro Thr Cys Pro Gly
 100 105 110
 Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu
 115 120 125
 Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Xaa Gly Met
 130 135 140
 Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr Ser Thr Gly
 145 150 155 160
 Pro Cys Arg Thr Cys Met Thr Thr Ala Gln Gly Thr Ser Met Tyr Pro
 165 170 175
 Ser Cys Cys Cys Thr Lys Pro Thr Asp Gly Asn Cys Thr Cys Ile Pro
 180 185 190
 Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu Trp Ala Ser
 195 200 205
 Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe
 210 215 220
 Val Gly Leu Ser Pro Thr Val Trp Leu Ser Val Ile Trp Met Met Trp
 225 230 235 240
 Tyr Trp Gly Pro Ser Leu Xaa Ser Ile Leu Ser Pro Phe Leu Pro Arg
 245 250 255

Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile
260 265